

Introduction

I. PURPOSE

This report provides Congress with an assessment of the overall readiness of the Armed Forces to fight in a nuclear, biological, and chemical (NBC) warfare environment in accordance with 50 USC 1523. This is the sixth report submitted under 50 USC 1523.*

The objective of the Department of Defense (DoD) NBC defense program is to enable our forces to survive, fight and win in NBC-contaminated environments. In addition to the continuing requirement to respond to two simultaneous Major Theater Wars, numerous rapidly changing factors influence the program and its management. These factors include a new defense strategy, an era of declining DoD resources to include force structure reductions, planning for warfighting support to regional threat contingencies, the effects of the breakup of the Soviet Union, the entry into force of the Chemical Weapons Convention (CWC), and continued proliferation of NBC weapons.

The President's October 1998 report, *A National Security for a New Century*, emphasizes the three key elements of the executive branch's strategy as (1) to enhance our security with effective diplomacy and with military forces that are ready to fight and win; (2) to bolster America's economic prosperity; (3) to promote democracy abroad. U.S. forces must have numerous capabilities in order to respond and deploy quickly to various worldwide needs. Counterproliferation capabilities are required by forces to meet worldwide needs, and NBC defense is integral to counterproliferation capabilities. The Commanders-in-Chief have identified their priorities for counterproliferation capabilities. These priorities are shown in Table I-1. Capabilities which are supported by the NBC defense program are highlighted in **bold**.

Table I-1. Required CINC Counterproliferation Capabilities

1. **Provide individual protection to forces and assist allies/coalition partners**
2. Intercept conventional delivery of WMD and control collateral effects
3. **Provide collective protection to forces and assist allies/coalition partners**
4. **Mitigate the effects of WMD use**
5. **Detect** and monitor development, production, deployment, **employment of WMD**
6. Communicate the ability/will to employ interdiction/response capabilities
7. Determine vulnerabilities in WMD development, production, transfer, deployment, and employment
8. Conduct off-site attack to destroy, disable, and deny WMD targets
9. Establish and maintain relations with allies, and potential adversaries to discourage development, production, and use of WMD
10. Seize, destroy, disable, and deny transport of WMD
11. Communicate the ability/will to employ defensive capabilities
12. Determine vulnerabilities in decision making process related to WMD
13. Conduct information warfare to destroy, disable, and deny WMD

* The text of 50 USC 1523, *Annual report on chemical and biological warfare defense*, (implemented as part of Public Law 103-160, the FY94 National Defense Authorization Act) is included at Annex G.

14. Support treaties, export controls, and political/diplomatic efforts
15. Provide alternatives to the pursuit of WMD
16. Provide intelligence collection capabilities in support of USG non-proliferation efforts
17. Conduct on-site attack to seize, destroy, disable, and deny WMD targets
18. Provide personnel, training, materiel, equipment to support security assistance
19. Destroy, disable, and deny actor's non-WMD resources and capabilities

The response to the threat of NBC weapons must be based on the nature of this threat, not just where the threat occurs. A key part of DoD's strategy is to stem the proliferation of such weapons and to develop an effective capability to deal with these threats. To focus the response to the threat, DoD and the intelligence community have completed several classified reports providing threat assessments on chemical and biological threats to U.S. forces. To minimize the effect of these threats to our forces, we need to continue improving our NBC defensive capabilities. These continuing improvements also contribute to our overall deterrence by demonstrating to an adversary that use of NBC weapons provides no military advantage. The DoD NBC defense program continues to work towards increasing the capabilities of Joint Forces to survive and continue their mission during conflicts which may involve the use of NBC weapons.

The number of nations with chemical and biological weapons (CBW) capabilities is increasing. Similarly, the sophistication of CBW capabilities is increasing. Proliferation of weapons technology, precision navigation technology, nuclear (medical, power, and industrial applications), and CBW technology to developing nations presents the United States with a complicated national security challenge. Intelligence efforts include collection and analysis of nations' "dual-use" nuclear, chemical and biological industrial capabilities, and development of the indications and warning of adversarial use of dual-use capabilities. Tailored intelligence documents are essential for developing and updating requirements for CB defense programs. Numerous threat documents tailored to the CB threat have been produced and are updated periodically. The Intelligence Community continues to review U.S. chemical and biological warfare intelligence requirements and assess the adequacy of those assets to execute the required intelligence program.

The DoD NBC defense program invests in technologies to provide improved capabilities that have minimal adverse impact on our war fighting potential. Our goals are to provide:

- improved capabilities to detect NBC agents in order to avoid their effects;
- lighter, less burdensome protection;
- decontamination systems with reduced logistical burden;
- decontaminants that are less toxic and environmentally safe;
- integrated, balanced system of force protection; and
- medical casualty care and management.

All of the capabilities integrated together as a system-of-systems are essential to avoid contamination and to sustain operational tempo on an asymmetric battlefield. Sound Joint doctrine and realistic training remain fundamental to our defense against NBC weapons.

II. THE CURRENT CHEMICAL AND BIOLOGICAL WARFARE THREAT

Northeast Asia

North Korea has been pursuing research and development related to biological warfare since the 1960s. Pyongyang's resources presently include a rudimentary (by Western standards) biotechnology infrastructure that is sufficient to support the production of limited quantities of toxins, as well as viral and bacterial biological warfare agents. In the early 1990s, an open press release by a foreign government referred to applied military biotechnology work at numerous North Korean medical institutes and universities dealing with pathogens such as anthrax, cholera, and plague. North Korea possesses a sufficient munitions-production infrastructure to accomplish weaponization of BW agents. North Korea acceded to the Biological Weapons Convention (BWC) in 1987.

By comparison, North Korea's chemical warfare program is believed to be mature and includes the capability, since 1989, to indigenously produce bulk quantities of nerve, blister, choking and blood chemical agents as well as a variety of different filled munitions systems. North Korea is believed to possess a sizable stockpile of chemical weapons, which could be employed in offensive military operations against the South. North Korea has also devoted considerable scarce resources to defensive measures aimed at protecting its civilian population and military forces from the effects of chemical weapons. Such measures include extensive training in the use of protective masks, suits, detectors, and decontamination systems. Though these measures are ostensibly focused on a perceived threat from U.S. and South Korean forces, they could also support the offensive use of chemical weapons by the North during combat. North Korea has yet to sign the Chemical Weapons Convention (CWC) and is not expected to do so in the near-term, due to intrusive inspection and verification requirements mandated by the agreement.

China possesses an advanced biotechnology infrastructure as well as the requisite munitions production capabilities necessary to develop, produce and weaponize biological agents. Although China has consistently claimed that it has never researched or produced biological weapons, it is nonetheless believed likely that it retains a biological warfare capability begun before acceding to the BWC.

China is believed to have an advanced chemical warfare program that includes research and development, production and weaponization capabilities. Its current inventory is believed to include the full range of traditional chemical agents. It also has a wide variety of delivery systems for chemical agents to include artillery rockets, aerial bombs, sprayers, and short-range ballistic missiles. Chinese forces, like those of North Korea, have conducted defensive CW training and are prepared to operate in a contaminated environment. As China's program is further integrated into overall military operations, its doctrine, which is believed to be based in part on Soviet-era thinking, may reflect the incorporation of more advanced munitions for CW agent delivery. China has signed and ratified the CWC.

South Asia

India has a well-developed biotechnology infrastructure that includes numerous pharmaceutical production facilities bio-containment laboratories (including BL-3) for working with lethal pathogens. It also has qualified scientists with expertise in infectious diseases. Some of India's facilities are being used to support research and development for BW defense purposes. These facilities constitute a substantial capability for offensive purposes as well. India is a signatory to the BWC of 1972.

India also has an advanced commercial chemical industry, and produces the bulk of its own chemicals for domestic consumption. New Delhi ratified the CWC in 1996. In its required declarations, it acknowledged the existence of a chemical warfare program. New Delhi has pledged that all facilities related to its CW program would be open for inspection.

Pakistan has a capable but less well-developed biotechnology infrastructure than India. Its facilities, while fewer in number, could nonetheless support work on lethal biological pathogens. Moreover, Pakistan is believed to have the resources and capabilities necessary to support a limited offensive biological warfare research and development effort. Like India, Pakistan is a signatory to the BWC.

Pakistan has a less-well developed commercial chemical industry but is expected to eventually have the capability to produce all precursor chemicals needed to support a chemical weapons stockpile. Like India, Pakistan has numerous munitions systems which could be used to deliver CW agent, including artillery, aerial bombs, and missiles. Pakistan has ratified the CWC.

The Middle East and North Africa

Iran's biological warfare program, which began during the Iran-Iraq war, is now believed to generally be in the advanced research and development phase. Iran has qualified, highly trained scientists and considerable expertise with pharmaceuticals. It also possesses the commercial and military infrastructure needed to produce basic biological warfare agents and may have produced pilot quantities of usable agent. Iran is a signatory to the BWC of 1972.

Iran initiated a chemical weapons program in the early stages of the Iran-Iraq war after it was attacked with chemical weapons. The program has received heightened attention since the early 1990s with an expansion in both the chemical production infrastructure as well as its munitions arsenal. Iran currently possesses munitions containing blister, blood, and choking agents and may have nerve agents as well. It has the capability to deliver CW agents using artillery shells and aerial bombs. Iran has ratified the CWC under which it is obligated to open suspected sites to international inspection and eliminate its CW program.

Prior to the Gulf War, *Iraq* developed the largest and most advanced biological warfare program in the Middle East. Though a variety of agents were studied, Iraq declared anthrax, botulinum toxin, and aflatoxin to have completed the weaponization cycle. During the Gulf War, coalition bombing destroyed or damaged many key facilities associated with BW activity.

However, it is suspected that a key portion of Iraq's BW capability, in the form of agent-filled munitions, was hidden and may have subsequently escaped damage. Nonetheless, Iraq declared, after the war, that all BW agent stockpile and munitions were unilaterally destroyed. United Nations Special Commission (UNSCOM) activity has, however, revealed this assertion as well as many others related to BW activity, to be inaccurate and misleading. As with its chemical program, Iraq intends to re-establish its BW capabilities if afforded the opportunity by the relaxation or cessation of UNSCOM inspection activity.

Iraq had a mature chemical weapons program prior to the Gulf War that included a variety of nerve agents, such as tabun (GA), sarin (GB), and GF, as well as the blister agent mustard, available for offensive use. Iraq also undertook a program, begun in 1985 and continuing uninterrupted until December 1990, to produce the advanced nerve agent VX. Recent UNSCOM findings indicate that Iraq had weaponized VX in Al Hussein missile warheads. Although Iraq's chemical warfare program suffered extensive damage during the Gulf War and subsequently from UNSCOM activity, Iraq retains a limited capability to re-constitute key parts of its chemical warfare program. Moreover, UNSCOM is still unable to verify elements of Iraqi declarations such as the disposal of chemical precursors, as well as the destruction of all chemical munitions. The comprehensive nature of Iraq's previous chemical warfare activity and the consistent pattern of denial and deception employed by Iraqi authorities indicate a high-level intent to rebuild this capacity, should Iraq be given the opportunity.

Syria has a limited biotechnology infrastructure but could support a limited biological warfare effort. Though Syria is believed to be pursuing the development of biological weapons, it is not believed to have progressed much beyond the research and development phase and may have produced only pilot quantities of usable agent. Syria has signed, but not ratified, the BWC.

Syria has a mature chemical weapons program, begun in the 1970s, incorporating nerve agents, such as sarin, which have completed the weaponization cycle. Future activity will likely focus on CW infrastructure enhancements for agent production and storage, as well as possible research and development of advanced nerve agents. Munitions available for CW agent delivery likely include aerial bombs as well as SCUD missile warheads. Syria has not signed the CWC and is unlikely to do so in the near future.

Libya's biological warfare program is believed to remain in the early research and development phase. Progress has been slow due in part to an inadequate scientific and technical base. Though Libya may be able to produce small quantities of usable agent, it is unlikely to transition from laboratory work to production of militarily significant quantities until well after the year 2000. Libya acceded to the BWC in 1982.

Libya has experienced major setbacks to its chemical warfare program, first as a result of intense public scrutiny focused on its Rabta facility in the late 1980s and more recently on its Tarhuna underground facility. Nevertheless, Libya retains a small inventory of chemical weapons, as well as the a CW agent production capability. Prior to closing its Rabta plant in 1990, Libya succeeded in producing up to 100 tons of blister and nerve agent at the site. Although the site was re-opened in 1995, ostensibly as a pharmaceutical plant, the facility is still believed

capable of producing CW agents. CW-related activities at the Tarhuna site are believed to be suspended. Libya has not ratified the CWC and is not likely to do so in the near future.

Independent States of the Former Soviet Union

The former Soviet offensive biological warfare program was the world's largest and consisted of both military facilities and nonmilitary research and development institutes. Non-military activity was centrally coordinated and performed largely through a consortium of institutes known as Biopreparat. This network of facilities was created in 1973 as a cover for activity related to biological warfare. This huge organization at one time employed up to 25,000 people and involved nearly 20 research, development and production facilities. The Russian government has committed to ending the former Soviet BW program, although serious questions about offensive BW capabilities remain. Key components of the former program remain largely intact and may support a possible future mobilization capability for the production of biological warfare agents and delivery systems. Moreover, work outside the scope of legitimate biological defense activity may be occurring at selected facilities within Russia. Such activity, if offensive in nature, would contradict statements by top Russian political leaders that offensive activity has ceased.

While former Soviet biological warfare facilities existed in Ukraine, Kazakhstan, and Uzbekistan, none are currently active. Moreover, the governments in these new republics are not believed to have plans to establish any future BW capability. Also, Belarus has no program and no intention of establishing one. Ukraine, Belarus, and Uzbekistan have ratified the BWC, while Kazakhstan has not yet signed it.

Russia has acknowledged the world's largest stockpile of chemical agents, amounting to approximately 40,000 metric tons. This stockpile, consisting mostly of weaponized agent includes artillery, aerial bombs, rockets, and missile warheads. Actual agents include a variety of nerve and blister agents. Additionally, some Russian chemical weapons incorporate agent mixtures, while others have added thickening materials in order to increase agent persistence. Russian officials do not deny that CW research has continued but claim that it is for defensive purposes and therefore not proscribed by the CWC. Many of the components for new binary agents developed under the former-Soviet program have legitimate civilian applications and are not considered on the CWC's schedule of chemicals.

PROLIFERATION

The United States faces a number of regional proliferation challenges. Many of these are detailed in the November 1997 report published by the Office of the Secretary of Defense, *Proliferation: Threat and Response*. In the Middle East, Iran continues with a concerted effort to acquire an independent production capability for all aspects of its chemical weapons program. Nonetheless, for the time being, it remains dependent on foreign sources for many chemical warfare-related technologies. China, as a key supplier of technologies and equipment for Iran's chemical warfare program, will play a pivotal role in determining whether Iran attains its long-term goal of independent production for these weapons. Iran is also pursuing a program to

purchase dual-use biotech equipment from other countries, ostensibly for civilian uses. Russia is a key source of biotechnology for Iran. Russia is an especially attractive target for Iranians seeking technical information on BW agent production processes.

Proliferation of chemical and biological warfare technology in South Asia also raises several important issues. India has exported a wide array of chemical products, including Australia Group-controlled items, to numerous countries of proliferation concern in the Middle East. The controlled items include specific chemical agent precursors, pathogens with biological warfare applications, and dual-use equipment which can be used in both chemical and biological warfare programs. Pakistan, on the other hand, may be seeking to upgrade key parts of its biotechnology infrastructure with dual-use equipment and expertise. Such acquisition efforts would reflect Pakistan's less-well developed biotechnology infrastructure.

Australia Group

The proliferation of chemical and biological warfare related technology remains a critical threat to peace and stability throughout the world. One mechanism through which industrialized countries have agreed to control the proliferation of key chemical and biological warfare-related technologies is the Australia Group. The Australia Group (AG) is a consortium of countries organized to slow the proliferation of chemical and biological warfare programs through the imposition of multilateral export controls. Initial efforts of this group began in June 1985 and focused on precursor chemicals used in the manufacture of chemical agents. However, convinced of the threat posed from biological weapons, AG countries subsequently agreed, in December 1992, to also control the sale of items that most likely could be used to develop biological agents and weaponry. The AG adopted a list of human pathogens consisting of 37 organisms, 10 toxins and associated genetically modified organisms, and a seven-item BW dual-use equipment list. In addition, the AG later adopted animal and plant pathogen lists in recognition of the threat posed from anti-crop and anti-animal biological warfare.

In North Africa, Libyan efforts to acquire foreign equipment and expertise related to biological warfare have been dealt a severe blow, largely because of UN sanctions. Due to the international community's encompassing restrictions on exports to Libya, efforts to proceed beyond laboratory-scale research and development related to biological warfare will be difficult.

OUTLOOK

In the next 10 years, the threat from the proliferation of CBW weapons will certainly increase. This will result from the development of chemical and biological agents that are more difficult to detect and from the adoption of more capable delivery systems.* We expect that more states with existing programs will master the production processes for complete weapons and will be less dependent on outside suppliers. States will be more proficient at incorporating chemical or biological agents into delivery systems and will be focusing on battlefield training as well as employment strategy and doctrine. Therefore, the threshold of some states to consider using these capabilities may be lowered.

* An assessment of potentially new biological agents that may challenge U.S. forces is in a DoD report to Congress entitled *Advances in Biotechnology and Genetic Engineering: Implications for the Development of New Biological Warfare Agents*, June 1996.

DoD does not expect significant increases in the number of government-sponsored offensive CBW programs. Nevertheless, the United States and its allies must be alert to this possibility as well as to the apparent growing interest in CBW on the part of sub-national groups such as terrorist organizations. Any nation with the political will and a minimal industrial base could produce CBW agents suitable for use in warfare. Efficient weaponization of these agents, however, does require design and production skills usually found in countries which possess a munitions development infrastructure or access to such skills from cooperative sources. On the other hand, crude agent dispersal devices could be fabricated by almost any nation or group. Such weapons might be capable of inflicting only limited numbers of casualties; nevertheless, they could have significant operational repercussions due to the psychological impact created by fears of CBW agent exposure.